

# Defending a lake water quality protection strategy



- **Laws, rules, standards, studies, models and management options abound**
- **Our ability to apply them is limited**

# Water quality standards



- **Water quality standards include the following components:**
- Beneficial uses - designation of the public uses and benefits our water resources provide to people.
- Numeric standards - allowable concentrations of specific pollutants in water, established to protect the beneficial uses.
- Narrative standards - descriptions or statements of unacceptable conditions in and on the water.
- **Nondegradation - extra protection for high-quality or unique waters to keep them from being degraded.**

# Water quality standards



- Water quality standards and related provisions are found in several Minnesota rules. Minnesota Rules Chapter 7050. This is the primary rule for statewide water quality standards. It includes:
  - A classification system of designated beneficial uses for both surface and ground waters,
  - Numeric and narrative water quality standards,
  - Nondegradation provisions,
  - Provisions for the protection of wetlands, and
  - Other provisions related to water quality standards and the protection of Minnesota's water resources from pollution.



# Water quality standards



- Minnesota has other rules that deal with water-related issues; for example, there are separate rules for:
- Permitting the discharge of treated wastewater,
- Permit fees,
- Feedlots,
- On-site sewage treatment systems, and
- Ground water standards.

# Water quality standards



- Minnesota water quality rules are available on the Office of the Revisor of Statutes Web page. The rules also can be accessed from the “Rules/Regulations” option on the MPCA’s home Web page.
- Chapter 7050. Water Quality Standards for Protection of Waters of the State
- Chapter 7052. Lake Superior Basin Water Standards
- Chapter 7053. Effluent Limits and Treatment Requirements for Discharges to Waters of the State

# Lake eutrophication standards



**Table 11. Lake eutrophication standards for aquatic recreation use assessments.**

| Ecoregion  | TP   | Chl-a | Secchi |
|--|------|-------|--------|
|  | ppb  | ppb   | meters |
| NLF – Lake trout (Class 2A)                            | < 12 | < 3   | > 4.8  |
| NLF – Stream trout (Class 2A)                          | < 20 | < 6   | > 2.5  |
| NLF – Aquatic Rec. Use (Class 2B)                      | < 30 | < 9   | > 2.0  |
|  |      |       |        |
| NCHF – Stream trout (Class 2a)                         | < 20 | < 6   | > 2.5  |
| NCHF – Aquatic Rec. Use (Class 2b)                     | < 40 | < 14  | > 1.4  |
| NCHF – Aquatic Rec. Use (Class 2b) Shallow lakes       | < 60 | < 20  | > 1.0  |
|  |      |       |        |
| WCBP & NGP – Aquatic Rec. Use (Class 2B)               | < 65 | < 22  | > 0.9  |
| WCBP & NGP – Aquatic Rec. Use (Class 2b) Shallow lakes | < 90 | < 30  | > 0.7  |

# Nondegradation standard



- The fundamental concept of nondegradation is simple - waterbodies with water quality better than applicable standards should be maintained at that existing high quality and not allowed to be degraded.

# Phosphorus = Algae





# $$\text{TMDL (AC)} = \text{WLA} + \text{LA} + \text{MOS}$$



Where:

- AC = **Assimilative Capacity** of the water body to achieve/maintain standards
- WLA = **Waste Load Allocation**, quantification of pollutant loads from point sources discharging to the water body
- LA = **Load Allocation**, quantification of pollutant loads from nonpoint sources
- MOS = **Margin of Safety**, reflects uncertainty in the analysis, a desire to provide an extra margin of protection for beneficial uses, or an allowance for future growth

# Study Results



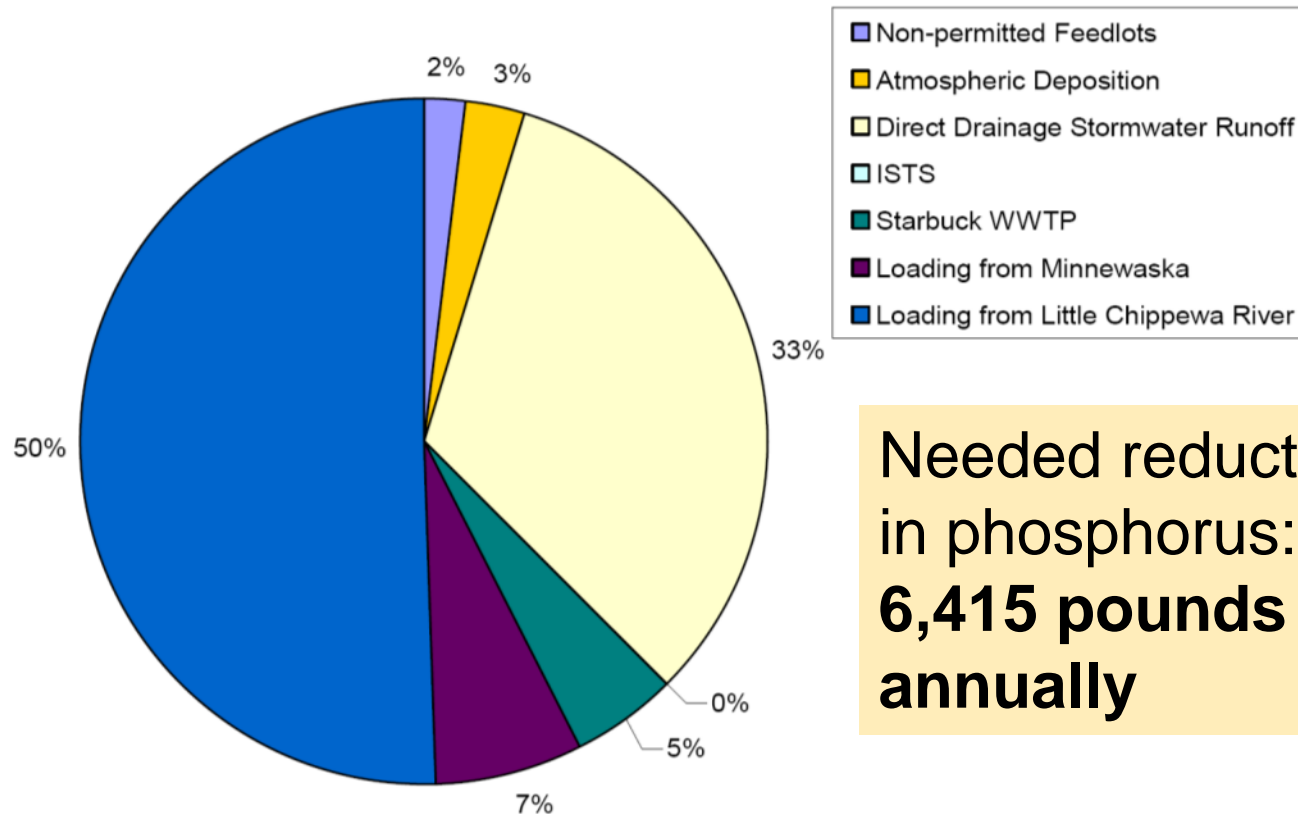
| Phosphorus Source                  | Annual TP Load [lbs/yr] |
|------------------------------------|-------------------------|
| Direct Drainage Stormwater Runoff  | 5,975                   |
| Non-permitted Feedlots             | 350.9                   |
| Atmospheric Deposition             | 527                     |
| ISTS                               | 11                      |
| Starbuck WWTP                      | 890                     |
| Loading from Lake Minnewaska       | 1,263                   |
| Loading from Little Chippewa River | 9,251                   |
| <b>Total</b>                       | <b>18,267.9</b>         |

**Needed reduction in phosphorus:  
6,415 pounds annually**

# Study Results



## ● Lake Emily, Pope County



Needed reduction  
in phosphorus:  
**6,415 pounds  
annually**

# The conundrum



- Water quality standards are usually only applied to permits and permitted activities.
- Non-point source pollution consists generally of un-permitted activities.



# Non-point source examples



- Livestock access to lakes
- Row crop agriculture
- Drainage
- Hydrologic modifications
- Logging
- Small-scale construction stormwater  
(less than one acre)

# Total Phosphorous Runoff Coefficients by Land Use

(Pounds/Acre/Year)



**Forest  
WetlandP  
rairie**  
.09 lbs.



**Pasture**  
.26 lbs.



**Urban  
medium  
density**  
.45 lbs.



**Mixed  
crops**  
.9 lbs.



**Row  
crops**  
1.3 lbs.



**Urban high  
density**  
1.3 lbs.

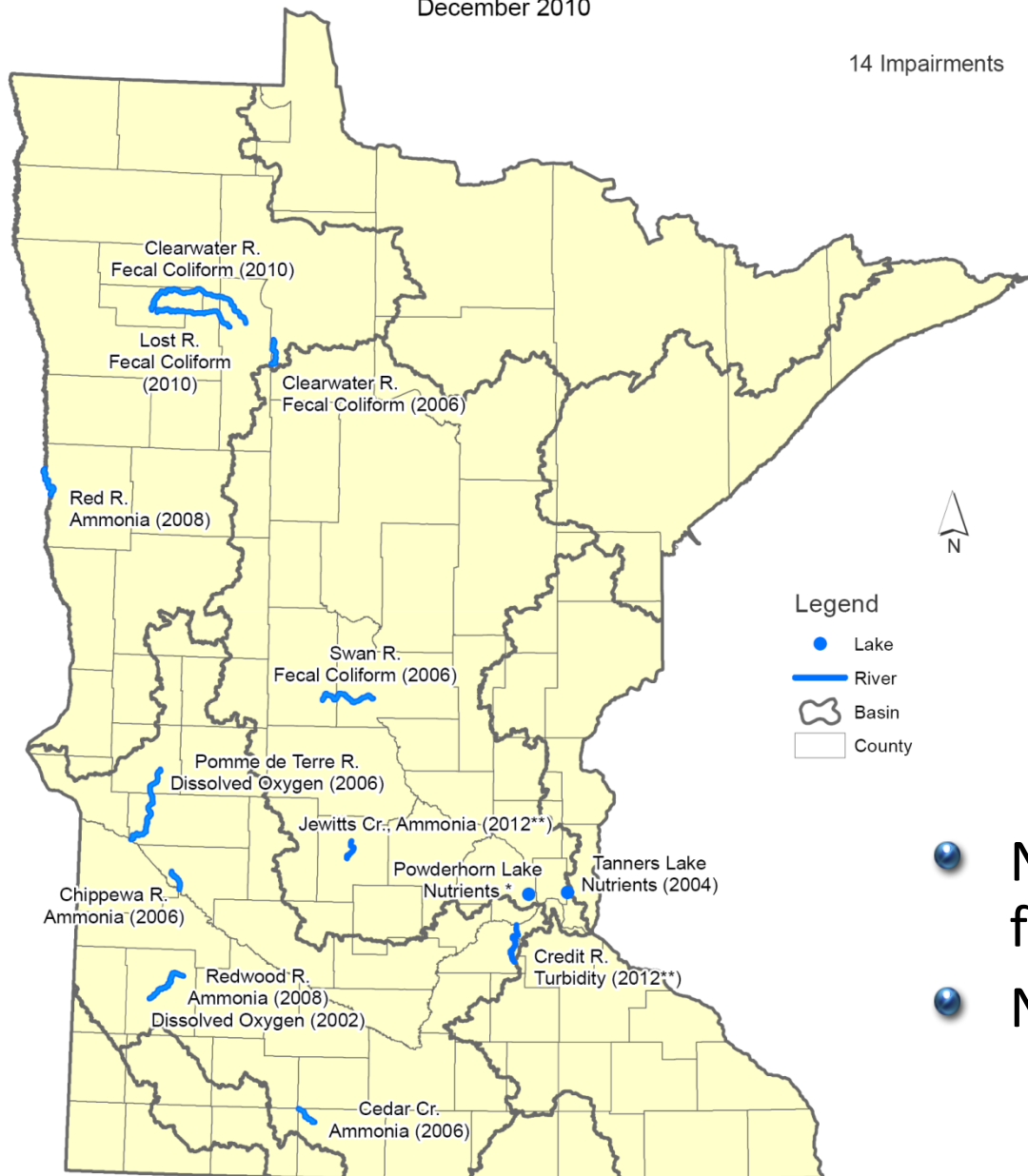
## Water Quality Response\*

\*One pound of phosphorous may result in up to 500 pounds of algal growth.

# Previous Impairments now Meeting Water Quality Standards due to Management Actions

December 2010

14 Impairments



- Number of lakes impaired for excess nutrients: 428
- Number of lakes restored: 2

# Developing a protection strategy



- Collaborative effort among agencies, local authorities, user groups, COLAs, watershed districts, etc.
- Tools being developed:
  - Identify risk factors
  - Develop priority management areas
  - Provide decision makers with “actionable” information



# Model for protection



|    |      |   |         |       |
|----|------|---|---------|-------|
| 1  | 1909 | Superior National Forest                | 960,969 | acres |
| 2  | 1917 | State Forest System                     | 482,848 | acres |
| 3  | 1979 | PILT payments for tax-forfeit lands     | 353,648 | acres |
| 4  | 1908 | Chippewa National Forest                | 336,780 | acres |
| 5  | 1985 | CRP Program Established                 | 126,218 | acres |
| 6  | 1999 | Forest Legacy Program                   | 122,180 | acres |
| 7  | 1891 | State Park System                       | 76,322  | acres |
| 8  | 1972 | Federal Clean Water Act                 |         |       |
| 9  | 2008 | Clean Water, Land, and Legacy Amendment |         |       |
| 10 | 1969 | Shoreland Management Act                |         |       |

# Recent actions



- Clean Water Legacy Act
- Clean Water Fund
- MPCA Major Watershed Restoration and Protection Plans (watershedwideTMDLs)
- Interagency cooperation (ongoing)

# Clean Water Legacy Act (2007)



- The purpose of the Clean Water Legacy Act is to protect, restore, and preserve the quality of Minnesota's surface waters.

The legislature finds that:

- (1) there is a close link between protecting, restoring, and preserving the quality of Minnesota's surface waters and the ability to develop the state's economy, enhance its quality of life, and protect its human and natural resources;
- (2) achieving the state's water quality goals will require long-term commitment and cooperation by all state and local agencies, and other public and private organizations and individuals, with responsibility and authority for water management, planning, and protection; and
- (3) all persons and organizations whose activities affect the quality of waters, including point and nonpoint sources of pollution, have a responsibility to participate in and support efforts to achieve the state's water quality goals.



● It's up to all of us





# Thank you!



Tim James, MPCA  
[tim.james@state.mn.us](mailto:tim.james@state.mn.us)  
218-846-8103

On the Web, Google  
“Minnesota Water Quality  
Standards MPCA”







